CT AND MRI FINDINGS IN PRIMITIVE PITUITARY ABSCESS: A CASE REPORT AND REVIEW OF LITERATURE

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SUMMARY

Pituitary abscess is not rare. Clinical and radiological features in a primitive pituitary abscess are reported. Transphenoidal surgery revealed an abscess. Preoperative diagnosis of pituitary abscess remains difficult. Sellar round cystic mass isointense to grey matter on T1, high intensity signal on T2, with a peripheral rim enhancement following gadolinium injection associated with thickened stalk and diabetes insipidus may be suggestive of pituitary abscess.

Key words: pituitary, abscess, CT, MRI.

INTRODUCTION

Despite the advent of CT and MRI, preoperative diagnosis of pituitary abscess remains difficult. We report the case of a 35-year old man who presented with a primitive pituitary Corynebacterium abscess which was diagnosed at surgery.

CASE REPORT

A 35-year-old immunocompetent man developed deterioration of his general condition with fatigue, anorexia, loss of weight, retro-orbital pain and fever two weeks before admission. On admission, physical examination showed he was pale, hypotensive and pyrexial (38 °C) with intermittent shivers. There were no clinical seats of infection and blood chemistry showed the absence of an inflammatory syndrome (low erythrocyte sedimentation rate, no hyperleucocytosis, normal C reactive protein). Neurological and ophtalmological examinations gave normal results. In particular, there was no meningeval syndrome. He was found to have diabetes insipidus with high daily diuresis (around 9 litres per day) and polydipsia. He also presented a reduction of libido. Endocrine system investigations disclosed significant deficiency of the thyrotropic, corticotropic, gonadotropic and somatotropic hormones. A prolactinoma was ruled out by prolactin dosage after TRH injection.

The sella turcica was normal on a straight X-ray film.

A CT scan of the pituitary region (figure 1) (Siemens Somatom DR H) with 2 mm thick coronal sections, performed before and after intravenous contrast injection, showed an intrasellar heterogeneous process (15 to 20 mm) with lateral deviation...
and thickening of the pituitary stalk, without any calcification or evident suprasellar extension. The sellar floor was very slightly eroded. The sphenoidal and the cavernous sinuses appeared to be normal.

Figure 1. — Preoperative examination. CT Scan of the pituitary region, coronal section after intravenous contrast injection showed an intrasellar hypodense heterogeneous expansive process with lateral deviation and thickening of the pituitary stalk. The sphenoidal and the cavernous sinuses appeared to be normal.

MRI was performed (using a Magnetom Vision 1,5 T machine) with 1 mm thick T1-weighted sagittal sections and 1 mm thick T1-weighted and T2-weighted coronal sections before and after intravenous gadolinium injection (figure 2). It confirmed the presence of an intrasellar lesion with low-intensity signal on T1-weighted sequences and high-intensity signal on T2-weighted sequences. This lesion was heterogeneous in each sequence and was not enhanced after gadolinium injection. There was a slight peripheral ring-enhancement. It also disclosed infiltration of hypothalamus and glandula pinealis areas. MRI was interpreted as indicating a pituitary germinal tumour requiring a biopsy for confirmation.

A naso-transsphenoidal approach was performed and the surgeon was surprised to withdraw purulent fluid from an abscess authenticated by the presence of altered leukocytes. The sphenoidal sinus appeared to be normal.

Bacteriological examination showed a Corynebacterium minutissimum, responsible for this abscess. Moreover, anatomopathological studies dismissed the existence of any traces of tumour.

The surgical outcome was good. The patient was treated with wide spectrum intravenous antibiotics and substitution hormonal treatment. He was discharged with a complete panhypopituitarism and returned to normal life.

DISCUSSION

Pituitary abscess is a non exceptional pituitary condition. More than 100 cases have been reported. It was first described by Simmonds [18] in 1914. Reports published in the pre-antibiotic era were usually based on autopsies.

Generally, it concerns only adults or adolescents without any sexual predominance [12]. Neurological signs are frequently seen (headaches in 90%, visual disorders such as fall of vision acuity, visual field defects, optic atrophy in 55%) [7, 12]. Fever and meningitic syndromes are associated respectively in 50% and 60% of the cases. Signs of impaired endocrine functions (fall of libido, polyuria-polydipsia, susceptibility to cold, amenorrhea etc.) are seen like in any other sellar or suprasellar lesion. High prolactin or growth hormone level can be found possibly due to stalk section effect. Most often patients had features of hypopituitarism [5, 12]. Diabetes insipidus is present in only 10% of adenomas, but occurs in almost half of patients with abscesses [19]. Our patient presented with a combination of diabetes insipidus and hypopituitarism without any clinical signs of infection. Blood tests often show loss of inflammatory signs (low erythrocyte sedimentation rate, no hyperleucocytosis). Bacteriological examinations are negative in 45-50% of the cases and some authors think this is due to the difficulty to isolate anaerobic micro-organisms [4, 12]. Others cast doubt on the reality of these abscesses and speak in terms of normal pituitary tissue reaction. When cultures are positive, many sorts of micro-organism can be seen: Streptococci, Pneumococci, Staphylococci, Neisseria, Escherichia coli, Klebsiella spp, Proteus spp etc., and exceptionally fungi [1, 10]. Nine cases of tuberculosis of the pituitary gland have been reported in the literature [6]. To our knowledge, this present case was the first time that Corynebacterium was isolated in pituitary abscess.

The physiopathogenic mechanism of these abscesses is unclear. Different types of aetiology can be distinguished. It can result of a local infection process such as, in order of frequency, sphenoidal sinusitis,
meningitis more often than not aseptic or thrombophlebitis of the cavernous sinus [3, 7]. Others infectious causes have been suggested: facial erysipelas, mastoiditis, acute otitis media, infectious metastasis from a distant seat of infection, septicaemia [17]. Moreover, pre-existing lesions in pituitary fossa such as pituitary adenoma (30% of the cases) [4], craniopharyngioma [15], Rathke’s cleft cyst [16] or granulomatous diseases are inclined to be complicated by infection. This is explained by the decreased resistance of the tumour against infection [10, 13]. Intrasellar abscess following transphenoidal surgery has been also documented [11]. The diagnosis was entertained in the differential with the onset of the new symptomatology following surgery. In fact pituitary abscess may be divided into primary and secondary types [19]. Secondary abscesses arise within an existing lesion. In about 50% of the cases [4], the starting point of the infection is unknown and the abscess is considered as primitive. That was the case of our patient, because there was no sign of a nearby or general infection process. Anatomopathological studies eliminated the existence of any traces of tumour. However it is also possible that the patient had a pituitary tumour that underwent complete necrosis. Bjerre [2] stated that infarction of pituitary adenoma is probably the most common cause of pituitary abscess.

Imaging studies are an important part of the diagnosis. It must be noted that despite the advent of modern methods (CT and MRI), the preoperative diagnosis was very rarely made in recent years, and thus underlines the difficulty of making such a diagnosis.

Standard radiography of the skull, centred on the sella turcica, must look for widening of the sella turcica, erosion of the sellar floor and opacity of the sphenoidal sinus.

CT unfortunately shows non-specific signs such as an intrasellar expansive process, often extending to

**Fig. 2.** — Preoperative examination.

a) MRI performed with T1 sagittal section.
b) T2 coronal section.
c) T1 coronal section after intravenous gadolinium injection. Sellar mass (*) with low-intensity signal on T1 weighted sequence and heterogeneous high-intensity signal on T2 weighted imaging without compression of the optic chiasm (→). Absence of the posterior lobe bright signal and slight peripherally enhancement after gadolinium injection.

**Fig. 2.** — Exploration préopératoire.

a) IRM. Coupe sagittale en T1.
b) Coupe coronale en T2.
c) Coupe coronale en T1 après injection de gadolinium. Masse intrasellaire (*) avec un hyposignal en T1 et un hypersignal hétérogène en T2 sans compression du chiasma optique (→). Absence du signal brillant du lobe postérieur et faible rehaussement périphérique après injection de gadolinium.
the suprasellar region, with hypodensity in the pituitary gland. Enhancement of its outline by contrast injection, or filling of the sphenoidal sinus with destruction of the sellar floor would very much suggest a pituitary abscess. The differential diagnosis of rim enhancement would include cystic lesions with or without superimposed infection.

M R I was performed in more than 10 cases of pituitary abscesses [3, 8, 9, 11-13, 16, 19]. It revealed intrasellar lesion with low-intensity signal on T1-weighted sequences and high-intensity signal on T2-weighted sequences; this indicated a liquid lesion, but it would also apply to any necrotic pituitary adenoma. Moreover, M R I may disclose ring enhancement after gadolinium injection representing either residual pituitary or an abscess capsule. Whereas necrotic tumours tend to have thick or nodular walls, rim enhancement may prove to be a common and more distinctive feature of abscesses [14]. These findings, consistent with matured abscesses, are non specific. A thickened stalk with an intrasellar solid mass isointense to grey matter on T1, high intensity on T2, low intensity on T1 and T2, and hypodensity in the pituitary gland. Enhancement of its outline by contrast injection would include cystic lesions with or without superimposed infection.

In our case, the presence of contrast-enhanced out line, even slight, and the thickened stalk should suggest the diagnosis. When confronted with CT or M R I data looking like necrotic tumoral process, the diagnosis of pituitary abscess should be considered, especially if there is an infectious syndrome (unexplained fever, repeated meningitis, sphenoidal sinusitis). When it is possible, Gallium-67 scan should be a part of the diagnosis strategy and/or in following the efficacy of subsequent antibiotic treatment.

Transphenoidal drainage of the abscess is the procedure of choice without further contaminating the cerebrospinal fluid. This approach is associated with less morbidity. Culture for isolating the offending organism from the contents need to include fungal and anaerobic techniques.

As a conclusion, the diagnosis of pituitary abscess remains difficult, even with the help of M R I. Diagnosis often occurs at surgery, which is the best treatment, allowing bacteriological examination and effective postoperative medical treatment. Nevertheless, it constitute an important differential possibility, especially in patients who present an inexplicable pituitary mass with or without clinical signs of an infection. Suspicion in sellar round cystic mass isointense to grey matter on T1, high intensity signal on T2, with a peripheral rim enhancement following gadolinium injection associated thickened stalk and diabetes insipidus is required and dictate the surgical approach.

REFERENCES